

Kari Kankaanpää

5.2.2025

FORTUM'S POSITION ON CARBON CAPTURE AND UTILISATION

Contents

| | | |
|-----|---|---|
| 1 | SUMMARY | 2 |
| 2 | BACKGROUND AND CONTEXT | 3 |
| 3 | INDUSTRIAL CARBON MANAGEMENT | 3 |
| 4 | FOCUS OF CARBON REMOVALS SHOULD BE ON CCU | 4 |
| 5 | CCU FROM BIOGENIC SOURCES TO BE PREFERRED | 5 |
| 6 | FORTUM'S KEY ASKS FOR CCU POLICY DEVELOPMENT | 5 |
| 6.1 | A separate EU target for carbon removals | 5 |
| 6.2 | Sustainable carbon sources to be preferred in the regulation..... | 6 |
| 6.3 | Economic incentives for CCU | 6 |
| | APPENDIX: CURRENT REGULATION ON CCUS..... | 8 |

Kari Kankaanpää

5.2.2025

1 SUMMARY

- Fortum welcomes the European Commission's ambition to develop industrial carbon management (ICM) rules. ICM should contribute to the goals of climate, renewable energy, waste and circular economy policies. To promote carbon removals, an EU-wide legal framework and economic incentives are needed.
- In our opinion, the EU 2040 climate target should include emissions reduction as the first priority, supported by carbon sinks and removals. Distinct targets for emissions reductions and carbon removals should be set to ensure both emissions reductions and removals.
- Fortum prioritises the utilisation of captured CO₂ (CCU) over permanent storage, advocating for the use of CO₂ in producing synthetic fuels, chemicals, polymers, and other materials. This approach supports the circularity of carbon, reducing reliance on virgin fossil sources and improving material independence.
- The CCU industry provides a good opportunity to indirectly electrify several industrial and transport sectors that are currently challenging to electrify directly. This will boost the increase of carbon-free electricity production in the EU.
- CCU from biogenic sources should be preferred. Together with clean hydrogen, captured biogenic CO₂ could enable a new, significant chemical industry and accelerate the hydrogen economy. In addition, CCU from fossil sources provides a decarbonisation option in a couple of hard-to-abate sectors for a certain transition period.
- The EU should prioritise extended financing for CCU through existing funds and the upcoming 2025 multiannual financing framework. To support initial industrial CCU investments, national-level guarantees and risk-sharing instruments are necessary. In the next phase, integrating CCU into the EU Emissions Trading System is crucial in order to have a market-based incentive for its deployment.
- While scaling up the supply of CCU products is important, boosting the demand for CCU products is equally key. To boost the demand, an EU framework that makes circulated carbon a wanted commodity is needed. For this, instruments like public procurement obligations for products using captured CO₂, clean standards for CCU products, and blending mandates for fuels should be considered.

Kari Kankaanpää

5.2.2025

2 BACKGROUND AND CONTEXT

As the impacts of climate change have become increasingly evident, the world needs to transition to a net-zero emissions economy as soon as possible. Achieving net zero and going beyond requires a dual focus on both emissions reduction and carbon removals. Capturing carbon dioxide (CO₂) and storing it permanently or utilising it as a raw material in various products has emerged as an important tool in climate change mitigation.

According to the United Nations' Intergovernmental Panel on Climate Change (IPCC), all realistic pathways to limit global warming to 1.5°C will involve the use of carbon removals. Even after reducing global emissions by 80-90%, we will need to remove between 5 and 10 Gt of carbon each year. McKinsey's analysis indicates that global removal capacity is currently 3-10 times short of this.

In the EU, carbon removals will play an indispensable part in reaching the climate neutrality goal for 2050. According to the Commission, carbon removals of at least 450 MtCO₂/year are required by 2050 and ~50% of this has to be CCU. It is evident that Europe can't achieve its climate targets without substantial industrial-scale CCUS.

Fortum wants to define its position in this rapidly evolving topic. As our own production fleet is already decarbonised to a large extent, CCUS is not relevant for ourselves. However, decarbonisation of industries is within the core of our strategy, and CCUS has an important role in meeting the net-zero GHG emissions ambitions of our industrial customers.

3 INDUSTRIAL CARBON MANAGEMENT

The EU regulatory framework for carbon removals is currently being developed. As the first step, the EU has approved the carbon removal certification framework (CRCF) that creates a unified certification scheme for carbon dioxide removals. Furthermore, in February 2024, the EU Commission published the Industrial Carbon Management Strategy (ICMS) in connection to the EU 2040 Communication. ICMS outlines upcoming EU actions relating to CCUS in order to decarbonise production processes in industrial sectors.

However, despite the supporting policies for industrial carbon management, the ramp-up of CO₂ removal technologies is currently still sluggish and operational large-scale projects are limited in Europe. This is due to the challenges in building a viable business case and the lack of a comprehensive regulatory framework.

Fortum welcomes the European Commission's ambition to establish rules for industrial carbon management. A clear legal framework and economic incentives are needed to boost the CCUS investments. In our opinion, industrial carbon management should contribute to the objectives of climate policy, renewable energy policy, and waste and circular economy policies. The targets of industrial carbon management should be closely integrated with the targets of other policy areas, e.g. ReFuel EU regulation (especially aviation and maritime) where the primary target is to replace current fossil-based fuels with renewables.

Kari Kankaanpää

5.2.2025

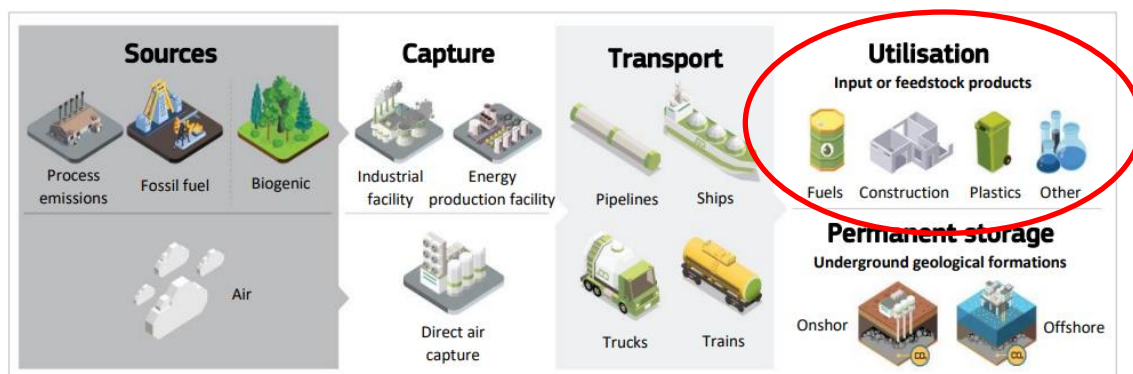
In addition to contributing to emissions reduction, utilisation of captured CO₂ could improve the EU's security of supply and autonomy by decreasing its high reliance on fossil carbon sources primarily sourced outside Europe, enhance a positive trade balance and bring other economic benefits, such as new jobs.

At the same time, EU Member States, e.g. Sweden and Finland, are developing national plans and incentives for technological carbon sinks.

4

FOCUS OF CARBON REMOVALS SHOULD BE ON CCU

In Fortum's opinion, all carbon belongs in circulation. Capturing CO₂ and utilising it to produce various products, such as synthetic fuels, chemicals, polymers or other materials, is a key aspect of the industrial carbon management value chain. Circularity of carbon means that carbon we use is recycled, new, virgin fossil sources will not be utilised, and the carbon already underground stays underground. Therefore, Fortum's priority in CCUS is the utilisation of captured CO₂ (CCU), as captured CO₂ as a raw material is more valuable than permanently stored CO₂.



By replacing fossil raw materials that are primarily sourced outside the EU, the CCU industry can effectively contribute to emissions reduction, energy security, improvement of the EU's energy trade balance, creation of new businesses and technologies, and thus improve EU autonomy in the future.

In this position paper, carbon removal refers to the removal of CO₂ from the flue gases of energy production and industrial processes and using the captured CO₂ in the manufacturing of various products (CCU) where the captured CO₂ provides an alternative carbon feedstock replacing the virgin fossil carbon. Carbon capture and storage (CCS) and direct air capture (DAC) are not in the scope of this position.

Numerous CCU technologies exist and are at different stages of development. CCU technologies should be viewed at the systemic level with preference to solutions that create wider value than storing carbon. Therefore, the permanence of the product made from captured carbon should not be the only factor to be considered.

Kari Kankaanpää

5.2.2025

5 CCU FROM BIOGENIC SOURCES TO BE PREFERRED

We highlight the need to distinguish between biogenic¹ and fossil² based CO₂. In principle, capture and utilisation of CO₂ from burning fossil fuels is not sustainable, because it would enable the continued burning of fossil fuels.

Capturing and utilising biogenic CO₂ will yield higher climate benefits. Biogenic CO₂ is supported in regulation and is the only CO₂ allowed to be used for the production of recycled fuels of non-biological origin (RFNBO), for example. Biogenic CO₂ is a significant untapped stream, especially in Finland and Sweden, and could be used in scale to replace fossil raw materials as technology and markets develop. Together with clean hydrogen, captured biogenic CO₂ would open up opportunities for a new, significant chemical industry and accelerate the hydrogen economy.

In the first phase, biogenic carbon should be used in the production of fuels (e.g. RFNBO) where demand is high and where regulation has already been established. The demand for biogenic carbon for material production is likely to increase at a later stage.

However, for some hard-to-abate sectors, such as cement, steel, chemicals and waste incineration, which face more challenges in emissions reduction and replacement of fossil fuels or raw materials, CCU from fossil sources provides a decarbonisation option for a certain transition period, at least up to 2050. Therefore, these kind of fossil-based sources could be eligible also for the sustainable status. This is due to the fact that if the EU aims to replace all or a majority of the existing virgin fossil-based hydrocarbons with more sustainable sources, the biogenic sources may not be sufficient to fulfil the overall demand.

6 FORTUM'S KEY ASKS FOR CCU POLICY DEVELOPMENT

6.1 A separate EU target for carbon removals

Fortum supports the EU target of around 90% net emissions reduction by 2040, as suggested by the Commission and aligned with the scientific recommendations by ESABCC.

In our opinion, the 2040 target should include emissions reduction as the first priority, supported by carbon sinks and removals. We prefer moving away from a traditional “net” target approach (emissions after deduction of removals) to distinct targets for emissions reductions and carbon removals in the 2040 and 2050 climate frameworks. As part of the target setting, the next EU Commission should define a long-term carbon budget to guide CCU capacity planning.

¹ Biogenic carbon dioxide (CO₂) is carbon dioxide released as a result of the combustion or decomposition of organic material, that is biomass and its derivatives. Examples include carbon dioxide released during the combustion of wood and biogas generated by decomposition.

² Fossil carbon dioxide (CO₂) is carbon dioxide stemming from the burning of solid, liquid or gaseous fossil fuels and the manufacture of cement.

Kari Kankaanpää

5.2.2025

Separate targets are key for a transparent path towards climate neutrality and to help avoid overreliance on natural sinks and carbon removals. A net target includes the risk that the option to count carbon removal against the target may delay emissions reductions, decreasing the urgency of reductions. The target setup could include even three elements: one for emissions reductions, another for nature-based removals, and a third for industrial removals. The separate target approach would create certainty on delivering both emissions reductions and removals.

6.2 Sustainable carbon sources to be preferred in the regulation

As the reduction of emissions is progressing in the EU, the role of carbon removals is becoming increasingly important. We call for a systemic view of CCUS as part of a wider climate solution portfolio. In addition to climate benefits, it can help the EU on its way to a more sustainable circular economy.

The regulation should not prioritise how the captured CO₂ is used but should provide incentives for different alternatives. Therefore, utilisation in all essential applications (fuels, chemicals, and materials) where virgin fossil materials can be replaced by sustainable captured CO₂ shall be encouraged.

The regulatory framework needs to recognise and prioritise sustainable CO₂ sources. Bioeconomy and waste incineration offer the best and most sustainable solutions for industrial carbon removals. Access to sustainable CO₂ is a prerequisite for the hydrogen economy and to provide solutions for fossil fuels phase-out.

Regarding waste policy, in order to improve circularity and incentivise investments, a CCU process producing materials out of waste feedstock should be considered recycling. Calculation rules for the recycling rate of CCU processes, which utilise waste-originated carbon, should be established.

6.3 Economic incentives for CCU

The existing EU regulatory framework doesn't provide an economic incentive, market value and business model for CCU from sustainable sources, besides the EU innovation funding and, to some extent, the voluntary carbon market. In the path towards climate neutrality and in order to reach the necessary scale of CCU deployment fast enough, alternative sources of carbon should be incentivised, including non-permanent CCU.

In order to create a well-functioning market framework for CCU solutions, it needs to be ensured that the market is built at the EU level rather than having a fragmented market with several different national-level support schemes or markets.

As the first step, the EU should ensure extended financing for CCU from the existing EU funds (e.g. ETS Innovation Fund, Connecting Europe Facility Energy) and ensure increased funding in the next multiannual financing framework in 2025. Funding should be based on project quality and excellence to promote innovation.

Additionally, the introduction of guarantees and risk-sharing instruments at the national level (e.g. carbon contracts for difference that guarantee a certain price for

Kari Kankaanpää

5.2.2025

CCU-based products) may be required to facilitate the first-of-a-kind industrial CCU investments.

As the next step, the incentives/value for CCU should be built on the basis of the existing and well-functioning EU Emissions Trading System. In practice, emissions allowances would be created for captured CO₂ and their value would be determined in the EU carbon allowance market. Integrating CCU into ETS is also essential for the liquidity of the EU allowance market.

Other instruments to be considered include demand-side targets for products containing sustainable carbon, for example public procurement obligations for products using captured CO₂, clean standards for CCU products and blending mandates for fuels.

Financial incentives, like tax credits, rebates and subsidies for consumers or businesses that choose CCU-based products, can reduce costs and increase adoption.

For additional information:

Kari Kankaanpää, Director, Public Affairs and Climate Policy,
kari.t.kankaanpaa@fortum.com

Jarkko Toropainen, Senior Manager, P2X Project Origination,
jarkko.toropainen@fortum.com

Kari Kankaanpää

5.2.2025

APPENDIX: CURRENT REGULATION ON CCUS

CCS Directive

In the EU, the transport and storage of CO₂ is regulated through Directive 2009/31/EC (CCS Directive), which also establishes a permitting regime and defines the relationship between CCS and the EU Emissions Trading System (EU ETS) in terms of finance: captured and stored CO₂ is considered ‘not emitted’ and can thus help producers to save money on the EU’s carbon market, potentially (at least partly) offsetting the costs of deploying and developing the technology. Under the Directive, Member States are able to select their own areas where they permit CCS and have the right to fully opt out of allowing it in their territory. An implementation report was published in October 2023.

ETS Directive

The 2021 revision of the EU ETS clarifies that CCS is fully exempted from the ETS with no need to surrender emission allowances.

ETS Directive also includes Article 12(3b), which removes the obligation to surrender EU allowances for GHG emissions that have been captured and utilised in such a way that they have become permanently chemically bound in a product. In 2024, the Commission adopted Delegated Act DA(2024) 5294 to clarify when CCU is considered to be permanently chemically bound. The Act defines only the chemical binding of CO₂ in mineral carbonates in construction as permanent.

The ETS also says that when carbon is captured and used in a way that it is reemitted, like in fuels such as RFNBO, ETS allowances would only need to be paid for once, where the CO₂ is originally produced.

The Commission is going to investigate non-permanent CCU products within the ETS by mid-2026. The 2026 review of the EU ETS will also assess the feasibility of including municipal waste incineration installations in the ETS.

EU carbon removal certification framework

The regulation concerns a voluntary certification framework, which should help shore up the investment climate for carbon removal projects by ensuring that claims of carbon being removed from the air are legitimate.

The legislation contains an open definition of what carbon removals are (in line with the definition from the UN Intergovernmental Panel on Climate Change): “technologies, practices, and approaches that remove and durably store carbon dioxide from the atmosphere.” There is no reference to negative emissions, however. As long as CCS and CCU projects are in line with the definition, they can be certified as carbon removal projects, which should make them more attractive to investors. A CCU product needs to store CO₂ for at least 35 years to “durably store” CO₂ from the atmosphere, for example.

Kari Kankaanpää

5.2.2025

RED3 provisions for RFNBO

The revision of the Renewable Energy Directive (RED III) contains quotas and targets for the use of renewable hydrogen as well as for CCU fuels such as RFNBO. These include, among others, a 5.5% aggregate target for the share of advanced biofuels (including recycled carbon fuels) and renewable fuels of non-biological origin (RFNBO) to the transport sector by 2030. Further targets for the use of RFNBO in the transport sector are set in FuelEU Maritime (for shipping) and ReFuelEU Aviation (for aviation). Thus, if CCU fuels fulfil the technical sustainability criteria to be considered an RFNBO or a recycled carbon fuel, they can contribute to these targets; the Fit for 55 targets should help demand for clean CCU fuels.

Industrial Carbon Management Strategy

In February 2024, the European Commission published its Industrial Carbon Management Strategy. It is a Communication (and thus non-legislative) covering carbon capture and storage (CCS), technical carbon removals, i.e. BioCCS and DACCS (CDR), and carbon capture and utilisation (CCU).

The strategy was presented together with a roadmap towards a 2040 climate target, which underlines the importance the EU foresees for carbon capture in helping to reach that target (the Commission advocates for a 90% emissions reduction target).

The Communication proposes numerous actions to create a value chain. The instruments include, e.g., regulation, financing and soft law. The Communication recognises that the price signal of emissions trading is currently insufficient to promote these technologies and, therefore, urges further development of the carbon market.

The strategy includes a target of 50 million tonnes per year of CO₂ storage capacity in 2030, but it also comes with further indicative targets: by 2040, the Commission argues that capturing around 280 million tonnes of CO₂ is necessary to reach a 90% emissions reduction. The strategy notes that by then, most carbon value chains in the EU's single market should be economically viable. By 2050 – when the EU aims to be carbon-neutral – the EU should be able to store approximately 450 million tonnes of CO₂, capturing the remaining carbon from hard-to-abate industries.

The Commission aims to promote sustainable carbon cycles in the industrial sector, among others through its biotech and biomanufacturing initiative. In addition, the Commission will establish specific CCU roadmaps and establish a framework for tracking industrial carbon management activities.

Communication on Sustainable Carbon Cycles (2021)

The Communication (COM(2021) 800) on Sustainable Carbon Cycles lays out how the Commission aims to close the loop on our economy's need for carbon, particularly fossil-based, as a material or feedstock for products through a reuse, reduce and recycle or substitution approach.

The goal is that of 20% of the carbon used in chemicals and plastic products should come from “sustainable non-fossil sources” by 2030.

Kari Kankaanpää

5.2.2025

Current national incentives on CCUS

Sweden

Sweden has committed to achieving net-zero greenhouse gas emissions by 2045. In addition to emission reductions, carbon capture plays an important role in the Swedish climate policy. The government is planning to allocate EUR 3.3 billion for bio-CCS from 2026 to 2046 and has decided to launch a reverse auction scheme to incentivise CCS and to fulfil its 2030 climate targets. In July 2024, the European Commission cleared Sweden's request to earmark EUR 3 billion in state aid for this purpose. The reverse auction will enable Sweden to capture and to permanently store a significant amount of carbon dioxide generated by biomass combustion or processing. The total potential for removals through bioCCS is estimated to be close to 50 MtCO₂ per year, including combined heat and power plants, paper and pulp mills, and waste incineration plants. In the reverse auctions, national support will be distributed across those who can capture and store carbon dioxide of biogenic origin at the lowest cost. The first auction is expected to take place at the end of 2024.

Finland

Finland has committed to carbon neutrality by 2035. According to the Government Programme, the government actively promotes the large-scale introduction of technological sinks in Europe and Finland and promotes the creation of incentives for CCUS in the EU legislation. The aim is to have a significant amount of technological sinks already in the 2020s. The total potential for removals through bioCCS is estimated to be 28 MtCO₂ per year, mainly from paper and pulp mills. The government has reserved a total of EUR 140 million in financing for the technological sinks for the whole government term.